Loureiro Engineering Associates, Inc.

April 27, 2001

State of Connecticut
Department of Environmental Protection
Bureau of Waste Management
79 Elm Street
Hartford, CT 06106-5127

RDMS DocID 00100165

Pratt & Whitney
CTD991067081
R-9
RDMS # 100165

Attn: Richard Hathaway
Lori Saliby

RE: Willow Brook/Willow Brook Pond
PCB Remediation Project
Response to Questions

Dear Mr. Hathaway and Ms. Saliby:

On behalf of our client, United Technologies Corporation, Pratt & Whiney Division (UTC/P&W), this letter has been prepared to respond to questions raised in your letter of April 10, 2001 to Lauren Levine of United Technologies Corporation. In that letter you asked for the following information to assist the department in the review of the November 2000 *Remedial Action Work Plan* and the January 2001 *Request for Variance, Engineered Control of Polluted Soils*:

1. Collection and analysis of surface water samples from Willow Brook Pond;
2. Collection and both mass analysis and SPLP analysis of sediment samples containing between 1 and 25 mg/kg of PCBs from Willow Brook Pond;
3. A separate cost and risk evaluation for the area of the former oil/water separator between the upper and lower Willow Brook Ponds considering the alternatives of remediation to a standard of 10 mg/kg PCBs and remediation to a standard of 25 mg/kg PCBs with the use of an engineered control;
4. Details on the thickness and volume of soil and sediment which would require excavation under the alternative scenario of remediation to the 1 mg/kg standard; and
5. Additional justification to the transportation and disposal cost estimate of $81.00 per ton for soil and sediment containing PCBs at concentrations of less than 50 mg/kg.

Surface Water Samples

On April 20, 2001, surface water samples were collected from three locations just above the bottom of Willow Brook Pond. The surface water samples were collected from areas of the pond where groundwater discharges to the pond and were biased to areas previously delineated as containing in the range of 10 mg/kg and 25 mg/kg of PCBs within the bottom sediment. Of the

three locations selected, one was within the upper Willow Brook Pond and two were within the lower Willow Brook Pond. The location at which samples were collected is depicted on the Site Plan provided as Attachment No. 1. The samples were obtained using a subsurface stanchion that was specifically designed for this project to facilitate collection of surface water from a zone located within three inches of the pond bottom sediments. The stanchion was made of 1-inch diameter PVC pipe and fittings.

Each of the surface water sampling devices were thoroughly purged to eliminate stagnant water and to ensure the collection of a representative sample of surface water. Both filtered and unfiltered samples were obtained using a peristaltic pump connected via a polyethylene suction tube to the stanchion. Dedicated tubing was used to sample each location to avoid cross contamination between samples. The samples were stored in coolers and transported to Severn Trent Laboratories for PCB analysis. The laboratory analysis was performed in accordance with EPA Method SW-846 8082 to determine the total and dissolved PCB concentrations in the surface water samples. No PCBs were detected in any of the six samples above the method reporting limit of 0.5 µg/l. A summary of the related laboratory analytical data is included in Attachment No 2.

Sediment Sampling

LEA representatives also performed sediment sampling within Willow Brook Pond on April 20, 2001. A total of four sediment sample locations were selected based on previous delineation of PCB-contaminated bottom sediments. As requested by DEP, the locations were biased to areas where anticipated PCB concentrations would be in the range of 1 to 25 mg/kg. Sediment samples were collected in accordance with LEA's *Standard Operating Procedure for Sediment Sampling in Shallow Rivers and Ponds.* Samples were obtained using a clam-shell sediment sampling device. The locations at which samples were collected are depicted on the Site Plan presented as Figure 1. A total of eight sediment samples were collected; two from each of the four locations. Sediment samples were collected upon completion of the above-described surface water sampling to mitigate the potential impacts of suspended sediments on the surface water sample analyses.

The samples were stored in coolers and transported to Severn Trent Laboratories for PCB analysis. The laboratory analysis was performed in accordance with EPA Method SW-846 8082. Upon confirmation that the collected samples met the required objective of containing between 1 and 25 mg/kg PCBs, three samples were selected for analysis by the SPLP to determine the potential mobility of the residual PCBs likely to remain following the implementation of the remediation project. The three samples were the subset of the eight samples that contained elevated mass concentrations of PCBs and included a sample containing greater than 25 mg/kg (43 mg/kg). No PCBs were detected in the SPLP extract from any of the three samples above the method reporting limit of 0.5 µg/l. A summary of the related laboratory analytical data is included in Attachment No 3.

The analytical data clearly supports the conclusion that PCBs that will remain in sediment

following remediation will not act as a source of contamination to groundwater or surface water.

Oil/Water Separator Cost and Risk Evaluation

LEA has prepared a separate cost and risk evaluation for the area of the former oil-water separator located between the upper and lower ponds. The evaluation compares the costs and risks associated with remediation of PCBs to a concentration of 25 mg/kg with the installation of an engineered control over those areas exceeding 1 mg/kg (hereinafter referred to as Option 1) to remediation of the subject area to the industrial/commercial direct exposure criteria (IDEC) of 10 mg/kg PCB (hereinafter referred to as Option 2). The cost evaluation is based on the premise that either of the two projects would be performed as stand-alone projects (i.e. not part of other remedial activities).

The cost associated with design and construction of Option 1 is summarized in Attachment No. 4. This cost estimate reflects the excavation and off-site disposal of all soil contaminated with PCBs in excess of 25 mg/kg (approximately 3,486 cubic yards). Upon completion of the excavation and collection of confirmatory samples, the area would be reshaped in preparation for cap construction. A flexible membrane liner (FML) would then be installed over all soil with PCB concentrations greater than 1 mg/kg. Three feet of clean fill will be deposited above the FML and the surface would be restored through the application of loam and seed. The total estimated design, construction, and disposal cost associated with Option 1 is $1,066,676. It has also been assumed for the purposes of the comparison that post-remediation maintenance and groundwater monitoring will have to be conducted for a period of 30 years. Assuming an annual groundwater monitoring cost of $4,500, an annual maintenance cost of $500, and a net present value rate of 4%, the net present value of this alternative is $1,152,276.

The cost associated with design and construction of Option 2 is also summarized in Attachment No. 4. This cost estimate reflects the excavation and off-site disposal of all soil contaminated with PCBs in excess of 10 mg/kg (approximately 4,942 cubic yards). As part of this option, it will be necessary to install sheeting along the western edge of the upper Willow Brook Pond and the eastern edge of the lower Willow Brook Pond as well as a temporary brace/support structure for the entire length of the 108-inch diameter corrugated metal pipe. Upon completion of the excavation and collection of confirmatory samples, the excavation would be backfilled and the area restored through the application of loam and seed. The total estimated design, construction, and disposal cost associated with Option 2 is $1,443,149. It has also been assumed for the purposes of the comparison that post-remediation groundwater monitoring will have to be conducted for a period of five years. Assuming an annual groundwater monitoring cost of $4,500 and a net present value rate of 4%, the net present value of this alternative is $1,463,174.

Option 2, remediation to a concentration of 10 mg/kg, is nearly $311,000 more expensive than Option 1, representing a 27% increase in overall project cost. This additional cost is not justified in terms of any incremental environmental benefit. This conclusion is based on the following facts:

1. The engineered control alternative renders all soils between 1 and 25 mg/kg inaccessible without the cap. In other words, all soil with PCB contamination between 1 and 25 mg/kg would be located at least 4 feet below finish grade. The current RSR limits the maximum concentration for PCBs in inaccessible soil at 10 mg/kg, a condition that does not exist for any other compound in the RSR. The 10 mg/kg standard in the RSR is an artifact of the previous TSCA rules. Under the new TSCA rules, a risk assessment can be used to justify leaving PCBs in soil at concentrations above 10 mg/kg. In our opinion, the "inaccessible soil" institutional control built into the RSR would justify leaving PCBs in place at concentrations well in excess of 25 mg/kg because compliance with the requirement for inaccessible soil ensures that exposure to PCBs is eliminated.
2. The current RSR allows for the request of an alternative criterion for PCBs. The request would be based on the performance of the risk assessment as detailed in the new TSCA rules. As noted above, in our opinion, the outcome of such a risk assessment would be a conclusion that concentrations of 25 mg/kg PCBs or greater in inaccessible soil would be allowed to remain in place.

Consequently, we believe that PCBs in "inaccessible soil" at concentrations up to 25 mg/kg do not pose an unacceptable risk to human health or the environment and that a request for such an alternative criterion under the RSR could be made and readily justified. However, instead of making such a request, UTC/P&W is proposing to render the soil "inaccessible" and provide an engineered control.

Thickness and Volume of Sediment

Provided in Attachment No. 5 is a Site Map depicting the lateral limits of an excavation to achieve a remediation goal of 1 mg/kg. Also provided in Attachment No. 5 is a spreadsheet of calculations that reference each of the excavation areas on the Site Map. As can be seen from the attached Site Map and spreadsheet, the volume of material to be removed to achieve the 1 mg/kg goal is in the range of 36,800 cubic yards. It should be noted, that the performance of a remediation to achieve a goal of 1 mg/kg will likely result in the need to perform multiple iterations of excavation, confirmatory sampling, additional excavation, etc. The incremental increase in costs for such likely occurrences has not been reflected in the evaluation of costs presented in the January 2001 *Request for Variance.* As a result, it is likely that the cost estimates presented for remediation to 1 mg/kg would prove to be understated should this alternative be implemented. Additionally, though not requested by the department, provided in Attachment No. 6 is a Site Map and corresponding spreadsheet of calculations for the estimate of approximately 12,500 cubic yards of contaminated soil and sediment to be excavated and disposed of in the implementation of remediation to 25 mg/kg with the installation of an engineered control.

Additional Justification of Cost for Disposal

Though not specifically requested in the April 10, 2001 letter, we have elected to provide additional documentation regarding the use of the $81.00 per ton estimate for the transportation and disposal of soil and sediment containing PCBs at concentrations of less than 50 mg/kg. Provided as Attachment No. 7 to this letter is an example of an April 6, 2001 letter sent to one of 9 waste disposal contractors. The letter requests the disposal vendors to provide the lowest cost alternative for transportation and disposal of the waste. It provides an accurate physical description of the contaminated soil and sediment including a complete set of analytical characterization data for the soil and sediment likely to be encountered. Moreover, it requests the disposal vendors to contact Massachusetts Subtitle D landfills as part of their response. In response to the request, LEA has received transportation and disposal cost estimates ranging from $74.00 per ton to $92.50 per ton (mid point cost of $83.25). None of the responding disposal vendors selected the use of a Subtitle D landfill in the State of Massachusetts. The stated rationale for this is that the Subtitle D landfills in Massachusetts do not represent the lowest cost alternative. Letters stating this have been provided as Attachment No. 7.

While we have received a cost estimate lower than the $81.00 estimate received in December 2000, the recent cost estimate is no more or no less appropriate than the original estimate for cost comparison purposes. In fact, the use of a mid-point cost is an industry-accepted approach for the preparation of cost evaluations. The volatility in the transportation and disposal market will certainly result in a different cost at the time of contracting for the project, anticipated to be July of 2001.

Lastly, the use of Phoenix Soil, Inc. (Phoenix) as an ultimate disposal facility is inappropriate. Phoenix Soil, Inc. also received the request for quotation provided in Attachment No. 7. In conversations with representatives of Phoenix subsequent to the transmission of the request, it was identified that they were unable to accept the materials. The reasons stated included the low percent solids (Phoenix requires upwards of 95% solids), the presence of up to 6% lime, concentrations of chromium and mercury above permit limits, and the fact that the waste would be defined as a dredge spoil, a material that they are prohibited by permit to receive. As of the date of this letter, Phoenix has rejected our repeated request to provide a letter documenting their above-stated reasons for not responding to the April 6, 2001 request for quotation.

United Technologies Corporation/Pratt & Whitney Division is committed to the completion of this project during the 2001 construction season. The concurrence of the department with the proposed approach is quite possibly the single most important step in achieving this goal. We sincerely hope that the information provided above and in the attachments assists the department in reaching the conclusion that the elimination of soil and sediment containing PCBs at concentrations in excess of 25 mg/kg with the installation of an engineered control is the appropriate approach for the remediation of Willow Brook and Willow Brook Pond. If we can be of any further assistance, please do not hesitate to contact us or Lauren Levine of UTC at 728-6520.

Sincerely,
LOUREIRO ENGINEERING ASSOCIATES, INC.

Brian A. Cutler, P.E.
Vice President

Attachment

cc: Jane Stahl, DEP
Elsie Patton, DEP
Lauren Levine, UTC
Ernest Waterman, EPA Region 1
Kimberly Tisa, EPA Region 1
Melissa Toni, CT DEP, IWRD

Attachment No. 1

Site Plan

LEGEND

CATCH BASIN
MANHOLE
UTILITY POLE
FIRE HYDRANT
LIGHT POLE
SIGN
GUARD RAIL/GUIDE WIRE
FENCE
CONTOUR (1' INTERVAL)
CONTOUR (5' INTERVAL)
11/229 ASSESSOR MAP No./LOT No.
EDGE OF PAVEMENT
PROPERTY LINE

RISLEY STREET

WILLOW STREET

WILLOW BROOK POND (UPPER)

WILLOW BROOK POND (LOWER)

WT-SW-004

WT-SW-005

WT-SW-006

WT-SD-80 and WT-SD-80A

WT-SD-81 and WT-SD-81A

WT-SD-82 and WT-SD-82A

WT-SD-83 and WT-SD-83A

LIMIT OF WILLOW BROOK/ WILLOW BROOK POND REMEDIATION PROJECT

22/1 22/2 22/3 22/4 22/5 22/6 22/7 22/8 22/9 22/10 22/11 22/12 22/13 22/14 22/15 22/16 22/17

11/229 11/209 11/208 11/207 11/206 11/205 11/204 11/203

N

MAP REFERENCE:
PORTIONS OF AERIAL TOPOGRAPHIC MAPS PERFORMED BY GOLDEN AERIAL SURVEYS, INC., DATE OF PHOTOGRAPHY: 3/17/91, HORIZONTAL CONTROL BY FUSS & O'NEIL, INC.

LEGEND

EXISTING SEDIMENT/SURFACE WATER SAMPLE

EXISTING SOIL BORING SAMPLE

50 0 50 100 150
SCALE IN FEET

United Technologies Corp. / Pratt & Whitney
SURFACE WATER & SEDIMENT
SAMPLE LOCATIONS
WILLOW BROOK/WILLOW BROOK POND
REMEDIATION PROJECT

Comm.No.
88UT002

LEA

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Attachment No. 2

Surface Water Sampling
Analytical Data Summary

Willow Brook/Willow Brook Pond
PCB Remediation Project
Surface Water Sampling
Analytical Data Summary

LEA Sample Identification Number	Sample Location Identifier
1995033	WT-SW-004
1995033 uf	WT-SW-004
1995035	WT-SW-006
1995035 uf	WT-SW-006
1995036	WT-SW-005
1995036 uf	WT-SW-005

Notes:

1. PCBs were not detected in any sample above the method reporting limit of 0.5 µg/l.

Attachment No. 3

Sediment Sampling
Analytical Data Summary

Willow Brook/Willow Brook Pond
PCB Remediation Project
Sediment Sampling
Analytical Data Summary

LEA Sample Identification Number	Sample Location Identifier	Constituent Detected	Concentration by Mass Analysis(µg/kg)	Concentration by SPLP Analysis(µg/l)
1995039	WT-SD-80	Aroclor 1248	<1400	
		Aroclor 1254	1600	
		Aroclor 1260	1400	
1995040	WT-SD-81	Aroclor 1248	1600 J	<0.5
		Aroclor 1254	2600	<0.5
		Aroclor 1260	2100 J	<0.5
1995041	WT-SD-82	Aroclor 1248	3100	
		Aroclor 1254	3900	
		Aroclor 1260	3000	
1995042	WT-SD-83	Aroclor 1248	800	
		Aroclor 1254	1200	
		Aroclor 1260	1000	
1995043	WT-SD-80a	Aroclor 1248	<540	
		Aroclor 1254	680	
		Aroclor 1260	580	
1995044	WT-SD-81a	Aroclor 1248	14000	<0.5
		Aroclor 1254	17000	<0.5
		Aroclor 1260	12000	<0.5
1995045	WT-SD-82a	Aroclor 1248	2100	<0.5
		Aroclor 1254	3500	<0.5
		Aroclor 1260	3200	<0.5
1995046	WT-SD-83a	Aroclor 1248	2600	
		Aroclor 1254	4600	
		Aroclor 1260	4000	

Notes:

1. PCBs were not detected in any sample above the method reporting limit of 0.5

Attachment No. 4

Oil/Water Separator Area
Cost and Risk Evaluation

United Technologies Corporation
Pratt & Whitney
Loureiro Engineering Associates, Inc. - Willow Pond Design/Build Cost Estimate
Remediation to <25 ppm PCB with Engineered Control
Oil/Water Separator Area

Work Item	Unit Cost	Units	Number of Units	Extended Cost
Engineering/Design	$50,000	l.s.	1	$50,000
Permitting and meetings with agencies	$20,000	l.s.	1	$20,000
Health and Safety Plan	$2,500	l.s.	1	$2,500
Mobilization/Demobilization	$6,000	each	2	$12,000
Site Preparation				
Erosion control	$3	l.f	250	$750
Decontamination facilities	$10,000	l.s.	20%	$2,000
Temporary construction fence	$5	l.f.	250	$1,250
Demolition of Structures				
Oil/water separator	$4,300	day	5	$21,500
Contaminated Soil/Sediment Excavation				
Dewatering	$2,000	week	2	$4,000
Dewatering Wastewater Treatment	$7,600	week	2	$15,200
Excavate contaminated soil and lime stabilize or stockpile for reuse	$32.00	c.y.	3,486	$111,552
Confirmatory sampling (including validation)	$226,000	l.s.	20%	$45,200
Transportation & Disposal				
PCB >50 ppm	$155	ton	2,922	$452,910
PCB < 50 ppm	$81	ton	3,000	$243,000
Offsite disposal of PCB-contaminated demolition debris	$165	ton	370	$61,050
Site Restoration				
Backfill	$20	c.y.	4,183	$83,664
Liner	$1.5	s.f.	9,800	$14,700
Loam & Seed	$0.5	s.f.	9,800	$4,900
Miscellaneous				
Office Trailer	$3,000	l.s.	1	$3,000
Survey during construction	$6,000	l.s.	1	$6,000
Total Estimated Cost				**$1,066,676**

Operation and Maintenance Costs:

Post Remediation Groundwater Monitoring Annual Cost	$4,500	
Post Remediation Operation and Maintenance	$500	
Assume 30 years, NPV rate of 4% (factor of 17.12)	$85,600	
Subtotal Groundwater Monitoring and Operation and Maintenance:		**$85,600**
Total Estimated Project Cost:		**$1,152,276**

United Technologies Corporation
Pratt & Whitney
Loureiro Engineering Associates, Inc. - Willow Pond Design/Build Cost Estimate
Remediation to <10 ppm PCB Without Engineered Control
Oil/Water Separator Area

Work Item	Unit Cost	Units	Number of Units	Extended Cost
Engineering/Design	$50,000	l.s.	1	$50,000
Permitting and meetings with agencies	$20,000	l.s.	1	$20,000
Health and Safety Plan	$2,500	l.s.	1	$2,500
Mobilization/Demobilization	$6,000	each	2	$12,000
Site Preparation				
Erosion control	$3	l.f	290	$870
Decontamination facilities	$10,000	l.s.	20%	$2,000
Temporary construction fence	$5	l.f.	290	$1,450
Demolition of Structures				
Oil/water separator	$4,300	day	5	$21,500
Contaminated Soil/Sediment Excavation				
Dewatering	$2,000	week	3	$6,000
Dewatering Wastewater Treatment	$7,600	week	3	$22,800
Excavate contaminated soil and lime stabilize or stockpile for reuse	$32.00	c.y.	4,942	$158,144
Confirmatory sampling (including validation)	$226,000	l.s.	20%	$45,200
Sheeting at ponds	$18	s.f.	3,300	$59,400
Culvert support	$300	l.f.	80	$24,000
Culvert restorations	$200	l.f.	80	$16,000
Transportation & Disposal				
PCB >50 ppm	$155	ton	2,922	$452,910
PCB < 50 ppm	$81	ton	5,477	$443,637
Offsite disposal of PCB-contaminated demolition debris	$165	ton	370	$61,050
Site Restoration				
Backfill	$20	c.y.	5,930	$118,608
Loam & Seed	$0.5	s.f.	9,800	$4,900
Miscellaneous				
Office Trailer	$3,000	l.s.	1	$3,000
Survey during construction	$6,000	l.s.	1	$6,000
Total Estimated Cost				**$1,443,149**

Operation and Maintenance Costs:

Post Remediation Groundwater Monitoring Annual Cost	$4,500		
Assume 5 years, NPV rate of 4% (factor of 4.45)	$20,025		
		Subtotal - Groundwater Monitoring:	**$20,025**
		Total Estimated Project Cost:	**$1,463,174**

Attachment No. 5

Thickness and Volume Estimates
Soil and Sediment Requiring Excavation
1 mg/kg Alternative

Willow Brook/Willow Brook Pond
PCB Excavation Areas for >1 ppm PCBs

Area Name	Area (ft^2)	Average Depth of Excavation (ft)	Area Excavation (yd^3)	Reduction in Vol. (yd^3)	Perimeter Length (ft)	Perimeter Excavation (yd^3)	Total Excavation (yd^3)	Estimate
1	35,500	4	5,259		1,800	533	5,793	5,795
2	42,000	5	7,778		1,300	602	8,380	8,380
3	73,000	4	10,815		2,000	593	11,407	11,410
4	9,200	16	5,452	830	700	3,319	7,941	7,940
5	12,700	3	1,411		970	162	1,573	1,575
6	2,100	14	1,089		180	653	1,742	1,740
			31,804			**5,861**	**36,835**	**36,840**

Total Excavation	**36,840 yd^3**

Notes:
Reduction in volume for area 4 is the estimated volume of the former oil/water separator.

LEGEND

- CATCH BASIN
- MANHOLE (MH)
- UTILITY POLE
- FIRE HYDRANT (HYD)
- LIGHT POLE
- SIGN
- GUARD RAIL/GUIDE WIRE
- FENCE
- CONTOUR (1' INTERVAL)
- CONTOUR (5' INTERVAL)
- 11/229 ASSESSOR MAP No./LOT No.
- EDGE OF PAVEMENT
- PROPERTY LINE

AREA 1
35,500 SQ. FT.

AREA 2
42,000 SQ. FT.

AREA 3
73,000 SQ. FT.

AREA 4
9,200 SQ. FT.

AREA 5
12,700 SQ. FT.

AREA 6
2,100 SQ. FT.

WILLOW BROOK POND (UPPER)

WILLOW BROOK POND (LOWER)

SISSON STREET

MERCER AVENUE

RISLEY STREET

WILLOW STREET

MAIN STREET

WILLOW ARMS

MAP REFERENCE:
PORTIONS OF AERIAL TOPOGRAPHIC MAPS PERFORMED BY GOLDEN AERIAL SURVEYS, INC., DATE OF PHOTOGRAPHY: 3/17/91, HORIZONTAL CONTROL BY FUSS & O'NEIL, INC.

N

100 0 100 200 300

SCALE IN FEET

United Technologies Corp. / Pratt & Whitney

AREAS > 1 PPM
WILLOW BROOK/WILLOW BROOK POND REMEDIATION PROJECT

Comm.No. 88UT002

LEA

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Attachment No. 6

Thickness and Volume Estimates
Soil and Sediment Requiring Excavation
25 mg/kg and Engineered Control Alternative

Willow Brook/Willow Brook Pond
PCB Excavation Areas for >25 ppm PCBs

Area Name	Area (ft^2)	Average Depth of Excavation (ft)	Volume of Area Excavation (yd^3)	Reduction in Volume (yd^3)	Perimeter Length (ft)	Perimeter Excavation (yd^3)	Total Excavation (yd^3)	Estimate
1	35,500	2.5	3,287		940	109	3,396	3,400
2	3,500	3	389		285	48	436	440
3	9,500	3	1,056		540	90	1,146	1,145
4	1,550	2	115		270	20	135	135
5	1,100	2	81		185	14	95	95
6	1,200	2	89		240	18	107	110
7	4,350	15	2,417	830	250	1,042	2,629	2,630
8	750	3	83		270	45	128	130
9	800	3	89		240	40	129	130
10	750	12	333	528	180	480	286	285
			7,939			**1,904**	**8,486**	**8,500**

Willow Brook/Willow Brook Pond
Additional Excavation for Stream Channel

Area Name	Length (ft)	Width of Excavation (ft)	Depth of Excavation (ft)	Area Excavation (yd^3)	Estimate
Stream Channe	900	25	3	2,500	2,500
					2,500

Willow Brook/Willow Brook Pond
Additional Excavation for Wetland for 1 to 25 ppm PCBs

Area Name	Area (ft^2)	Depth of Excavation (ft)	Area Excavation (yd^3)	Reduction in Vol. (yd^3)	Perimeter Length (ft)	Perimeter Excavation (yd^3)	Total Excavation (yd^3)	Estimate
1	39,000	1	1,444		1,120	21	1,465	1,500
								1,500

Total Excavation	**12,500 yd^3**

Notes:
Reduction in volume for area 7 is the estimated volume of the former oil/water separator.
Reduction in volume for area 10 is the estimated volume of soil above layer impacted with PCBs at >25 ppm.

LEGEND

- CATCH BASIN
- MANHOLE (MH)
- UTILITY POLE
- FIRE HYDRANT (HYD)
- LIGHT POLE
- SIGN
- GUARD RAIL/GUIDE WIRE
- FENCE
- CONTOUR (1' INTERVAL)
- CONTOUR (5' INTERVAL)
- 11/229 ASSESSOR MAP No./LOT No.
- EDGE OF PAVEMENT
- PROPERTY LINE

AREA 4 (1550 SQ. FT.)
AREA 3 (9500 SQ. FT.)
AREA 2 (3500 SQ. FT.)
AREA 1 (35,500 SQ. FT.)
AREA 10 (750 SQ. FT.)
AREA 9 (800)
AREA 8 (750 SQ. FT.)
AREA 7 (4,350 SQ. FT.)
AREA 6 (1200 SQ. FT.)
AREA 5 (1,100 SQ. FT.)

SISSON STREET
MERCER AVENUE
RISLEY STREET
WILLOW BROOK POND (UPPER)
WILLOW STREET
WILLOW BROOK POND (LOWER)
MAIN STREET
WILLOW BROOK
WILLOW ARMS
11/223
11/224
11/225
11/226
11/229
11/209
11/208
11/207
11/206
11/205
11/204
11/203
22/1
22/2
22/3
22/4
22/5
22/6
22/7
22/8
22/9
22/10
22/11
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22/15
22/16
22/17
10/35
10/36
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100 0 100 200 300
SCALE IN FEET

MAP REFERENCE:
PORTIONS OF AERIAL TOPOGRAPHIC MAPS PERFORMED BY GOLDEN AERIAL SURVEYS, INC., DATE OF PHOTOGRAPHY: 3/17/91, HORIZONTAL CONTROL BY FUSS & O'NEIL, INC.

United Technologies Corp. / Pratt & Whitney

AREAS > 25 PPM
WILLOW BROOK/WILLOW BROOK POND REMEDIATION PROJECT

Comm.No. 88UT002

LEA

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Attachment No. 7

Additional Justification Information
Transportation and Disposal Costs
Soil and Sediment Containing Less Than 50 mg/kg PCBs

Loureiro Engineering Associates, Inc.

10 Pages Total

VIA FACSIMILE - (508) 261-9768

April 6, 2001

United Oil Recovery
136 Gracey Avenue
Meriden, CT 06451

Attn: Richard Vovscko

RE: Transportation and Disposal Cost Estimate
10,700 Tons of PCB-Contaminated Sediment

Dear Mr. Vovscko:

Loureiro Engineering Associates, Inc. (LEA) is soliciting transportation and disposal cost estimates for approximately 10,700 tons of sediment containing total PCBs at concentrations less than 50 milligrams per kilogram. The project is located in the Town of East Hartford, Connecticut. The sediment will be contain up to 6 percent lime by weight to eliminate free draining liquids and will likely contain less than 60 percent solids. Use of liners is highly recommended. The sediment will be loaded by LEA directly into vehicles to be provided by the selected waste transportation and disposal vendor. It is anticipated that up to 850 tons of sediment will be available for transport from the site on a daily basis. Additional characterization data has been attached for your reference.

At a minimum, cost estimates are to be provided for disposal to a Massachusetts and/or Connecticut subtitled D landfill. Additionally, at your discretion, if lower cost disposal facilities are known that are capable of receiving the sediment, a cost estimate for that facility should also be provided. All disposal facilities should be identified by name and address in your proposal. Cost estimates should be inclusive of all applicable costs including, transportation, disposal, taxes, demurrage, etc. and should be broken into two categories: TRANSPORTATION and DISPOSAL. Additional categories may be added, as necessary, to provide a more detailed accounting of your proposal.

Your proposals should be submitted to my attention via facsimile at (860) 747-8822 by no later than 5:00 p.m. on Thursday, April 19, 2001. Should you have any questions, please contact me at (860) 747-6181.

Sincerely,
LOUREIRO ENGINEERING ASSOCIATES, INC.

Brian A. Cutler

Brian A. Cutler, P.E.
Vice President

attachment

East Hartford, Connecticut
Constituents in Sediment

Chemical/Constituent	Average Concentration	Maximum Concentration	Units
Inorganics			
Chromium(VI)	0.67	0.80	mg/kg
Lead	330	2890	mg/kg
Mercury	1	9.2	mg/kg
Nickel	108	595	mg/kg
Silver	34	444	mg/kg
Thallium	0.235	0.25	mg/kg
Tin	11	7.2	mg/kg
Antimony	13	0	mg/kg
Arsenic	4	22	mg/kg
Barium	84	494	mg/kg
Beryllium	0.15	0.17	mg/kg
Cadmium	12	103	mg/kg
Chromium	1105	7390	mg/kg
Cobalt	6.45	8.8	mg/kg
Copper	62	96	mg/kg
Vanadium	10.1	12.8	mg/kg
Zinc	148.7	772	mg/kg
Selenium	0.3	8	mg/kg
Lead (TCLP)	0.485	0.72	mg/L
Mercury (TCLP)	ND	ND	mg/L
Silver (TCLP)	ND	ND	mg/L
Arsenic (TCLP)	ND	ND	mg/L
Barium (TCLP)	0.8	1.1	mg/L
Cadmium (TCLP)	0.06	0.06	mg/L
Chromium (TCLP)	0.02	0.04	mg/L
Selenium (TCLP)	ND	ND	mg/L
PCBs - Total			
PCBs - Total	< 50	<50	mg/kg
Pesticides and Herbicides			
Heptachlor Epoxide	ND	ND	ug/kg
Endosulfan Sulfate	ND	ND	ug/kg
Aldrin	ND	ND	ug/kg
BHC,alpha	ND	ND	ug/kg
BHC,beta-	6.43	21	ug/kg

East Hartford, Connecticut
Constituents in Sediment

Chemical/Constituent	Average Concentration	Maximum Concentration	Units
BHC,delta-	ND	ND	ug/kg
Endosulfan II	27.8	110	ug/kg
DDT,p,p'-	9.56	25	ug/kg
Chlordane	ND	ND	ug/kg
BHC,gamma-	ND	ND	ug/kg
Dieldrin	28.46	62	ug/kg
Endrin	68.66	260	ug/kg
Methoxychlor	ND	ND	ug/kg
DDD,p,p'-	ND	ND	ug/kg
DDE,p,p'-	ND	ND	ug/kg
Endrin aldehyde	39.1	140	ug/kg
Heptachlor	ND	ND	ug/kg
Toxaphene	ND	ND	ug/kg
Endosulfan I	ND	ND	ug/kg
Heptachlor Epoxide (TCLP)	ND	ND	ug/L
Chlordane (TCLP)	ND	ND	ug/L
BHC,gamma- (TCLP)	ND	ND	ug/L
Endrin (TCLP)	ND	ND	ug/L
Methoxychlor (TCLP)	ND	ND	ug/L
Heptachlor (TCLP)	ND	ND	ug/L
Toxaphene (TCLP)	ND	ND	ug/L
Petroleum Hydrocarbons			
Total Petroleum Hydrocarbons	4203	24100	mg/kg
Characteristics			
Cyanide Reactivity	1.45	0	mg/kg
Total Solids	-1	0	%
Sulfide Reactivity	25	0	mg/kg
Total Organic Carbon	70005	272000	mg/kg
Cyanide (TCLP)	ND	ND	mg/L
Organics			
Aniline,4-nitro-	ND	ND	ug/kg
Phenol,4-nitro-	ND	ND	ug/kg
Benzyl alcohol	ND	ND	ug/kg
Piperidine,n-nitroso-	ND	ND	ug/kg
Ether, 4-Bromophenyl Phenyl	ND	ND	ug/kg

East Hartford, Connecticut
Constituents in Sediment

Chemical/Constituent	Average Concentration	Maximum Concentration	Units
Xylenol,2,4-	533	559	ug/kg
Ethylamine,n-methyl-n-nitroso-	ND	ND	ug/kg
Cresol,4-	1141	2200	ug/kg
Benzene,1,4-dichloro-	ND	ND	ug/kg
Aniline,4-chloro-	ND	ND	ug/kg
Phenylenediamine,1,4-	ND	ND	ug/kg
Ether, bis(2-Chloro-1-methylethyl)	ND	ND	ug/kg
Phenol	536	120	ug/kg
Picoline,2-	ND	ND	ug/kg
Pyridine	ND	ND	ug/kg
Ether, bis(2-Chloroethyl)	ND	ND	ug/kg
Methane,bis(2-chloroethoxy)-	ND	ND	ug/kg
Phthalate, bis(2-ethylhexyl)-	3449	43900	ug/kg
Phthalate, di-n-octyl	ND	ND	ug/kg
Benzene,hexachloro-	ND	ND	ug/kg
Benzidine,3,3'-dimethyl-	ND	ND	ug/kg
Anthracene	4645	95500	ug/kg
Benzene,1,2-(methylenedioxy)-4-propeny	ND	ND	ug/kg
Benzene,1,2,4-trichloro-	ND	ND	ug/kg
Phenol,2,4-dichloro-	ND	ND	ug/kg
Toluene,2,4-dinitro-	ND	ND	ug/kg
Phenethylamine,alpha,alpha-dimethyl	ND	ND	ug/kg
Diphenylamine	ND	ND	ug/kg
Triethyl Phosphorothioate,o,o,o-	ND	ND	ug/kg
Pyrene	23456	480000	ug/kg
Naphthoquinone,1,4-	ND	ND	ug/kg
Phthalate, dimethyl	ND	ND	ug/kg
Cresols, NOS	684	1140	ug/kg
Dibenzofuran	1540	26900	ug/kg
Naphthylamine,alpha-	ND	ND	ug/kg
Aramite	ND	ND	ug/kg
Kepone	ND	ND	ug/kg
Propylene,hexachloro-	ND	ND	ug/kg
Benzo[ghi]perylene	6754	132000	ug/kg
Indeno(1,2,3-cd)pyrene	6309	123000	ug/kg
Benz[e]acephenanthrylene	8566	147000	ug/kg

East Hartford, Connecticut
Constituents in Sediment

Chemical/Constituent	Average Concentration	Maximum Concentration	Units
Fluoranthene	26737	537000	ug/kg
Benzo[k]fluoranthene	3630	41200	ug/kg
Acenaphthylene	532	2510	ug/kg
Chrysene	12200	232000	ug/kg
Diallate	ND	ND	ug/kg
Pronamide	ND	ND	ug/kg
Thionazin	ND	ND	ug/kg
Methyl Parathion	ND	ND	ug/kg
Phorate	ND	ND	ug/kg
Disulfoton	ND	ND	ug/kg
Tetraethyl Dithiopyrophosphate	ND	ND	ug/kg
Propane),2,2'-oxybis(2-chloro-	ND	ND	ug/kg
Isodrin	ND	ND	ug/kg
Benzo[a]pyrene	9724	183000	ug/kg
Phenol,2,4-dinitro-	ND	ND	ug/kg
Benzilic acid,4,4'dichloro-, Ethyl ester	ND	ND	ug/kg
Famphur	ND	ND	ug/kg
Dibenz[a,h]anthracene	2497	40800	ug/kg
Acetamide,n-fluoren-1-yl-	ND	ND	ug/kg
Cresol,4,6-dinitro-o-	ND	ND	ug/kg
Benzene,1,3-dichloro-	ND	ND	ug/kg
Diethylamine,n-nitroso-	ND	ND	ug/kg
Parathion	ND	ND	ug/kg
Cholanthrene,3-methyl-	ND	ND	ug/kg
Benz[a]anthracene	10506	208000	ug/kg
Quinoline,4-nitro-, 1-oxide	ND	ND	ug/kg
Benz[a]anthracene,7,12-dimethyl-	ND	ND	ug/kg
Phenol,2,3,4,6-tetrachloro-	ND	ND	ug/kg
Cresol,4-chloro-m-	ND	ND	ug/kg
Morpholine,n-nitroso-	ND	ND	ug/kg
Aniline,n,n-dimethyl-p-phenylazo-	ND	ND	ug/kg
Dimethoate	ND	ND	ug/kg
Toluene,2,6-dinitro-	ND	ND	ug/kg
Benzene,pentachloro-	ND	ND	ug/kg
Acetophenetidide,p-	ND	ND	ug/kg
Methanesulfonate,ethyl-	ND	ND	ug/kg

East Hartford, Connecticut
Constituents in Sediment

Chemical/Constituent	Average Concentration	Maximum Concentration	Units
Aniline	ND	ND	ug/kg
Dimethylamine,n-nitroso-	ND	ND	ug/kg
Dipropylamine,n-nitroso-	ND	ND	ug/kg
Methanesulfonate,methyl-	ND	ND	ug/kg
Ethane,hexachloro-	ND	ND	ug/kg
Phenol,2,2'-methylenebis(3,4,6-trichloro	ND	ND	ug/kg
Ether, 4-Chlorophenyl Phenyl	ND	ND	ug/kg
Ethane,pentachloro-	ND	ND	ug/kg
Cyclopentadiene,hexachloro-	ND	ND	ug/kg
Isophorone	ND	ND	ug/kg
Benzene,pentachloronitro-	ND	ND	ug/kg
Acenapthalene	1880	32400	ug/kg
Phthalate, diethyl	507	28.2	ug/kg
Phthalate, di-n-butyl	532	459	ug/kg
Phenanthrene	23167	514000	ug/kg
Phthalate, Benzyl Butyl	522	774	ug/kg
Diphenylamine,n-nitroso-	520	1000	ug/kg
Fluorene	2414	44000	ug/kg
Carbazole	ND	ND	ug/kg
Phenol,2,6-dichloro-	ND	ND	ug/kg
Butadiene,hexachloro-	ND	ND	ug/kg
Phenol,pentachloro-	ND	ND	ug/kg
Phenol,2,4,6-trichloro-	ND	ND	ug/kg
Aniline,2-nitro-	ND	ND	ug/kg
Phenol,2-nitro-	ND	ND	ug/kg
Dinoseb	ND	ND	ug/kg
Naphthalene	1614	25100	ug/kg
Naphthalene,2-methyl-	915	10000	ug/kg
Naphthalene,2-chloro-	ND	ND	ug/kg
Naphthylamine,beta-	ND	ND	ug/kg
Methapyrilene	ND	ND	ug/kg
Benzidine,3,3'-dichloro-	ND	ND	ug/kg
Biphenyl,4-amino-	504	300	ug/kg
Butanamine,n-butyl-n-nitroso-1-	ND	ND	ug/kg
Pyrrolidine,n-nitroso-	ND	ND	ug/kg
Benzene,4-allyl-1,2-(methylenedioxy)-	ND	ND	ug/kg

East Hartford, Connecticut
Constituents in Sediment

Chemical/Constituent	Average Concentration	Maximum Concentration	Units
Cresol,2-	553	351	ug/kg
Benzene,1,2-dichloro-	ND	ND	ug/kg
Toluidine,o-	ND	ND	ug/kg
Phenol,2-chloro-	ND	ND	ug/kg
Benzene,1,2,4,5-tetrachloro-	ND	ND	ug/kg
Phenol,2,4,5-trichloro-	ND	ND	ug/kg
Acetophenone	ND	ND	ug/kg
Benzene,nitro-	ND	ND	ug/kg
Aniline,3-nitro-	ND	ND	ug/kg
Benzene,1,3,5-trinitro-	ND	ND	ug/kg
Toluidine,5-nitro-o-	ND	ND	ug/kg
Benzene,1,3-dinitro-	ND	ND	ug/kg
Benzene,1,4-dichloro- (TCLP)	ND	ND	ug/L
Pyridine (TCLP)	ND	ND	ug/L
Benzene,hexachloro- (TCLP)	ND	ND	ug/L
Toluene,2,4-dinitro- (TCLP)	ND	ND	ug/L
Cresols, NOS (TCLP)	ND	ND	ug/L
Ethane,hexachloro- (TCLP)	ND	ND	ug/L
Butadiene,hexachloro- (TCLP)	ND	ND	ug/L
Phenol,pentachloro- (TCLP)	ND	ND	ug/L
Phenol,2,4,6-trichloro- (TCLP)	ND	ND	ug/L
Cresol,2- (TCLP)	ND	ND	ug/L
Phenol,2,4,5-trichloro- (TCLP)	ND	ND	ug/L
Benzene,nitro- (TCLP)	ND	ND	ug/L
Benzene,ethyl-	49	232	ug/kg
Styrene	ND	ND	ug/kg
Propylene,cis-1,3-dichloro-	ND	ND	ug/kg
Propylene,trans-1,3-dichloro-	ND	ND	ug/kg
Benzene,1,4-dichloro-	ND	ND	ug/kg
Ethane,1,2-dibromo-	ND	ND	ug/kg
Acrolein	ND	ND	ug/kg
Propylene,3-chloro-	ND	ND	ug/kg
Ethane,1,2-dichloro-	ND	ND	ug/kg
Propionitrile	ND	ND	ug/kg
Acrylonitrile	ND	ND	ug/kg
Acetic acid, Vinyl ester	ND	ND	ug/kg

East Hartford, Connecticut
Constituents in Sediment

Chemical/Constituent	Average Concentration	Maximum Concentration	Units
Pentanone,4-methyl-2-	ND	ND	ug/kg
Toluene	57	465	ug/kg
Benzene,chloro-	ND	ND	ug/kg
Butylene,trans-1,4-dichloro-2-	ND	ND	ug/kg
Ether, 2-Chloroethyl Vinyl	ND	ND	ug/kg
Dioxane,1,4-	ND	ND	ug/kg
Methane,dibromochloro-	ND	ND	ug/kg
Propylenenitrile,2-methyl-2-	ND	ND	ug/kg
Butadiene,2-chloro-1,3-	ND	ND	ug/kg
Ethylene,tetrachloro-	50	34	ug/kg
Xylenes (Total)	76	1100	ug/kg
Ethylene,cis-1,2-dichloro-	ND	ND	ug/kg
Ethylene,trans-1,2-dichloro-	ND	ND	ug/kg
Ether, Methyl tert-butyl	ND	ND	ug/kg
Ethylene,1,2-dichloro-, NOS	ND	ND	ug/kg
Benzene,1,3-dichloro-	ND	ND	ug/kg
Carbon Tetrachloride	ND	ND	ug/kg
Hexanone,2-	ND	ND	ug/kg
Ethane,1,1'-oxybis-	ND	ND	ug/kg
Ethane,1,1,1,2-tetrachloro-	ND	ND	ug/kg
Ethanol	ND	ND	ug/kg
Acetone	87	281	ug/kg
Methane,trichloro-	ND	ND	ug/kg
Benzene	ND	ND	ug/kg
Ethane,1,1,1-trichloro-	ND	ND	ug/kg
Methane,bromo-	ND	ND	ug/kg
Methane,chloro-	ND	ND	ug/kg
Methane,iodo-	ND	ND	ug/kg
Methane,dibromo-	ND	ND	ug/kg
Ethane,chloro-	ND	ND	ug/kg
Ethylene,chloro-	ND	ND	ug/kg
Acetonitrile	ND	ND	ug/kg
Methane,dichloro-	ND	21.4	ug/kg
Carbon Disulfide	ND	14.9	ug/kg
Methane,tribromo-	ND	ND	ug/kg
Methane,bromodichloro-	ND	ND	ug/kg

East Hartford, Connecticut
Constituents in Sediment

Chemical/Constituent	Average Concentration	Maximum Concentration	Units
Ethane,1,1-dichloro-	ND	10	ug/kg
Ethylene,1,1-dichloro-	ND	ND	ug/kg
Methane,trichlorofluoro-	ND	3	ug/kg
Methane,dichlorodifluoro-	ND	ND	ug/kg
Ethane,pentachloro-	ND	ND	ug/kg
Propanol,2-methyl-1-	ND	ND	ug/kg
Propane,1,2-dichloro-	ND	ND	ug/kg
Butanone,2-	62	98	ug/kg
Ethane,1,1,2-trichloro-	ND	ND	ug/kg
Ethylene,trichloro-	50	24.8	ug/kg
Ethane,1,1,2,2-tetrachloro-	ND	ND	ug/kg
Methyl Methacrylate	ND	ND	ug/kg
Benzene,1,2-dichloro-	ND	ND	ug/kg
Propane,1,2-dibromo-3-chloro-	ND	ND	ug/kg
Propane,1,2,3-trichloro-	ND	ND	ug/kg
Ethylmethacrylate	ND	ND	ug/kg
Benzene,1,4-dichloro- (TCLP)	ND	ND	ug/L
Ethane,1,2-dichloro- (TCLP)	ND	ND	ug/L
Benzene,chloro- (TCLP)	ND	ND	ug/L
Ethylene,tetrachloro- (TCLP)	ND	ND	ug/L
Carbon Tetrachloride (TCLP)	ND	ND	ug/L
Methane,trichloro- (TCLP)	ND	ND	ug/L
Benzene (TCLP)	ND	ND	ug/L
Ethylene,chloro- (TCLP)	ND	ND	ug/L
Ethylene,1,1-dichloro- (TCLP)	ND	ND	ug/L
Butanone,2- (TCLP)	ND	ND	ug/L
Ethylene,trichloro- (TCLP)	ND	ND	ug/L

UNITED INDUSTRIAL SERVICES, INC.
DIVISION OF UNITED OIL RECOVERY, INC

136 GRACEY AVENUE, MERIDEN, CT 06451-2270
TEL. (203) 238-6745
FAX (203) 630-2503

Loueiro Engineering Associates
100 Northwest Drive
Plainville, CT.
Attn. Brian Cutler-P.E.

4/27/01

Dear Mr. Cutler,
Pursuant to uor discussion of 4/27/01 regarding the suitability of acceptance of the 10,700 tons of low level PCB material into Massachusetts landfills. We reveiwed the provided data and based on the TPH levels provided and the presence of the PCB's even from non-TSCA sources, the best options we were able to obtain based on costs, volume and acceptance were from landfills not located in Massachusetts. I hope this answers the questions you had. Should you have any further questions,please do not hesitate to contact me.

Sincerely,

Richard S. Vovcsko
Sr. Engineer